1 Sample Rate Equations

All timestamps and sample intervals are recorded as microseconds. Sample rates are given in Hz (samples per second).

1.1 Converting timestamps into sample intervals

1. Let *timestamps* be an array of consecutive timestamps
2. Let $diff()$ be a function that computes and returns the difference between consecutive items (e.g. $diff(1, 3, 9) = 2, 6$)
3. Let $len()$ be a function that returns the total number of items in a collection

Then, the mean (μSI) and standard deviation (σSI) of the sample interval (SI) can be found with

$$SI = diff(timestamps) \tag{1}$$
$$M = len(SI) \tag{2}$$
$$\mu SI = \frac{\sum_{i=0}^{M-1} SI_i}{M} \tag{3}$$
$$\sigma SI = \sqrt{\frac{(\sum_{i=0}^{M-1} SI_i - \mu SI)^2}{M}} \tag{4}$$

1.2 Converting sample intervals into sample rates

He we will find the mean sample rate (μSR) in Hz and the standard deviation of the sample rate (σSR) in Hz.

If μSI (eq 4) ≤ 0, then both μSR and σSR should be set 0. Otherwise, these values can be found with the following equations:

$$\mu SR = \frac{1}{\mu SR * 10^{-6}} \tag{5}$$
$$\sigma SR \approx \mu SR^2 * \sigma SI * 10^{-6} \tag{6}$$